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ATOMIC FORCE MICROSCOPE FOR THE STUDY OF MARS DUST AND SOIL

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Recent Pathfinder data has indicated that much of the Martian atmospheric material is below 1 micrometer in diameter. To determine the structure of the individual particles will require deep sub-micron imaging instruments. A prime candidate for such an instrument is the atomic force microscope (AFM), essentially an ultrahigh resolution surface profilometer. To illustrate the utility of the technique, Mars dust analogs have been investigated using an AFM. Sub-micron particles of montmorillonite clay and iron oxide were analyzed. In addition, the abrasion from the Mars dust analogs on various substrates was examined. This work will be useful in the evaluation of instrument parameters and sample handling techniques needed for the remote operation of an AFM on Mars. Development of an instrument suitable for a micromission deployment will be described with particular reference to the microscopy station currently being fabricated for the '01 Mars Environmental Compatibility Assessment.

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